

Application No. 09/857,682
Amendment dated November 7, 2005
Response to Office Action dated May 11, 2005

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claims 1-35 (Canceled)

Claim 36 (Currently Amended) An arrangement for a feedback control system connected to a medical apparatus, the arrangement comprising:

 a controllable device (10);

 a measuring device (7) adapted to measure a measuring value from a measuring point, which measuring value is dependent on the operation of the controllable device (10);

 a controlling device (9);

 a user interface by which the controlling device (9) can be monitored by means of set values;

 wherein the controlling device (9) is adapted to monitor the controllable device (10) on the basis of the measuring ~~values~~ and set ~~values~~; and

 means (15a, 15b, 15c) for periodically feeding a reference signal (16) to the measuring device, the reference signal having a real, known reference value (17);

 wherein the controlling device (9) is adapted to compare the measuring value (18) obtained from the measuring device (7) based on the reference signal with the real, known reference value (17) of the reference signal;

 wherein the controlling device (9) is adapted to take a safety measure when the measuring value (18) obtained on the basis of the reference signal and the real, known reference value (17) differ substantially from each other.

Claim 37 (New) The arrangement of claim 36, wherein the safety measure comprises disconnection of control of the controllable device.

Claim 38 (New) The arrangement of claim 36, wherein the safety measure comprises opening of a safety valve.

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Claim 39 (New) The arrangement of claim 36, wherein the safety measure comprises providing an alarm signal.

Claim 40 (New) The arrangement of claim 36, wherein the controllable device (10) comprises one of a gas mixer and ventilator used in patient care, and wherein the measuring device (7) comprises a gas monitor and wherein the controlling device (9) comprises a separate controller.

Claim 41 (New) The arrangement of claim 36, wherein the reference signal (16) is a gas sample.

Claim 42 (New) The arrangement of claim 41, further comprising means for feeding the reference signal (16) which comprise a selector valve (15a) adapted to periodically send a gas sample used as a reference signal (16) to a gas monitor.

Claim 43 (New) The arrangement of claim 42, wherein the gas sample is a fresh gas sample.

Claim 44 (New) The arrangement of claim 42, wherein backup valves (15b, 15c) are adapted to control the operation of the selector valve (15a).

Claim 45 (New) An arrangement for a feedback control system connected to a medical apparatus, the medical apparatus having a controllable device (10) for controlling a patient care factor, the arrangement comprising:

 a signal responsive control device (9), the control device (9) operable to control the controllable device (10);

a user interface (12), the user interface (12) coupled to the control device (9) and providing an input signal to the control device (9) to control the controllable device (10) to provide the patient care factor;

a first means for sampling (8), the first means for sampling (8) providing a patient care factor sample from the medical apparatus;

means for measuring (7), the means for measuring (7) having an input for receiving a sample and an output coupled to the control device (9) for providing an output signal indicative of a measured value of a sample property;

means for providing a reference value (17), the means for providing a reference value (17) providing a reference signal indicative of a known value for a sample property that can be measured by the means for measuring (7);

a second means for sampling (16), the second means for sampling (16) providing a sample exhibiting the sample property, a known value of which is indicated by the reference signal;

means for switching (15a, 15b, 15c), the means for switching (15a, 15b, 15c) providing the patient care factor sample from the first means for sampling (8) to the means for measuring (7) to cause the means for measuring (7) to provide a first output signal to the control device (9) suitable for use in conjunction with the input signal from the user interface (12) to control the controllable device (10),

the means for switching (15a, 15b, 15c) being switchable to provide the property exhibiting sample from the second means for sampling (16) to the means for measuring (7) to cause the means for measuring (7) to provide a second output signal; and

a comparator for receiving the reference signal and the second output signal from the means for measuring (7), the comparator for comparing the reference signal and the second output signal to determine the operative condition of the means for measuring (7).

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Claim 46 (New) The arrangement according to claim 45, wherein the means for measuring is a gas monitor and wherein the first means for sampling provides a gas sample and the second means for sampling provides a gas sample.

Claim 47 (New) The arrangement according to claims 45, wherein the means for providing a reference value provides a reference signal obtained from the controllable device (10).

Claim 48 (New) The arrangement according to claim 45, wherein the means for providing a reference value provides a reference signal obtained from a source that is independent of the controllable device (10).

Claim 49 (New) The arrangement according to claim 45, wherein the means for switching (15a, 15b, 15c) comprises a valve connected to the first and second means for sampling.

Claim 50 (New) The arrangement according to claim 49, further comprising at least one backup valve (15b, 15c) for the valve connected to the first and second means for sampling.

Claim 51 (New) The arrangement according to claim 45, wherein the medical apparatus comprises anesthesia administration apparatus and wherein the controllable device comprises a gas dispenser.

Claim 52 (New) The arrangement according to claim 46, wherein the medical apparatus comprises anesthesia administration apparatus and wherein the controllable device comprises a gas dispenser.

Claim 53 (New) The arrangement according to claim 51, wherein the medical apparatus comprises anesthesia administration apparatus and wherein the controllable device comprises a gas dispenser, and wherein the means for sampling provides a patient breathing

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gas sample, wherein the second means for sampling provides a fresh gas sample and wherein the means for providing a reference value provides a gas concentration reference signal.

Claim 54 (New) The arrangement according to claim 45, further comprising means for instituting safety measures when the values of the reference signal and the second output signal differ by a predetermined amount.

Claim 55 (New) The arrangement according to claim 54, wherein the means for instituting safety measures is further defined as instituting a safety measure comprising disconnection of control of the controllable device (10) responsive to the comparison made by the comparator.

Claim 56 (New) The arrangement according to claim 54, wherein the medical apparatus has a safety valve and wherein the means for instituting safety measures is further defined as instituting a safety measure comprising opening the safety valve responsive to the comparison made by the comparator.

Claim 57 (New) The arrangement according to claim 54, wherein the medical apparatus comprises an alarm and wherein the means for instituting safety measures comprises providing an alarm signal responsive to the comparison made by the comparator.

Claim 58 (New) An arrangement for a feedback control system connected to a medical apparatus, the medical apparatus having a gas dispenser for controlling a patient care factor, the arrangement comprising:

a controller, the controller operable to control the gas dispenser;
a user interface, the user interface coupled to the controller and providing an input signal to the controller to control the gas dispenser to provide the patient care factor;

a first means for sampling, the first means for sampling providing a patient care factor sample from the medical apparatus;

gas monitor, the gas monitor having an input for receiving a sample and an output coupled to the controller for providing an output signal indicative of a measured value of a sample property;

means for providing a reference value, the means for providing a reference value providing a reference signal indicative of a known value for a sample property that can be measured by the gas monitor;

a second means for sampling, the second means for sampling providing a sample exhibiting the sample property, a known value of which is indicated by the reference signal;

means for switching, the means for switching providing the patient care factor sample from the first means for sampling to the gas monitor to cause the gas monitor to provide a first output signal to the controller suitable for use in conjunction with the input signal from the user interface to control the gas dispenser;

the means for switching being switchable to provide the property exhibiting sample from the second means for sampling to the gas monitor to cause the gas monitor to provide a second output signal; and

a comparator for receiving the reference signal and the second output signal from the gas monitor, the comparator for comparing the reference signal and the second output signal to determine the operative condition of the gas monitor.